

April 20, 1875.

R. Hudson, Esq., F.R.S., V.P., in the Chair.

The Secretary read the following report on the additions to the Society's Menagerie during the month of March 1875.

The total number of registered additions to the Society's Menagerie during the month of March was 96, of which 58 were by presentation, 24 by purchase, 4 by exchange, 4 by birth, and 6 were received on deposit. The total number of departures during the same period, by death and removals, was 95.

The most noticeable additions during the month of March were as follows:—

1. An Indian Wild Dog (*Canis primævus*, Hodgson, sive *C. rutilans*, Temminck), from British Burmah, presented March 3rd, by Lord Northbrook, the Governor General of India. We have only twice before\* received living examples of this rare animal, which is said to be becoming very rare in all parts of India.

2. Three Black-crested Kites (*Baza lophotes*, Temm.) from India, purchased 5th March, being the first examples of this peculiar bird of prey ever received alive.

3. A Himalayan Magpie (*Pica bottanensis*, Delessert, Rev. Zool. 1840, p. 100) from Bootan, purchased 6th March. This representative of our well-known Magpie is likewise new to the Society's collection †.

4. A Hamadryad Snake (*Ophiophagus elaps*, Schlegel), purchased of Mr. W. Jamrach, 5th March. This specimen is about eight feet long, and is the first living example of this large and deadly Serpent received in Europe. Mr. Jamrach states that he obtained this specimen at Dhappa near Calcutta, along with some ordinary Cobras.

5. A Bearded Falcon (*Falco biarmicus*, Temminck), presented by Capt. Parry, of the barque 'Isabella Blyth,' March 15th. This Falcon was captured by Capt. Parry at sea about 100 miles west of the Cape of Good Hope. I am not aware that this southern form of our Peregrine has been previously alive in the gardens.

6. Two Silky Hangnests (*Amblyramphus holosericus*, Scop.) from the Argentine Republic, received in exchange. This form is also a new addition to our aviaries.

7. A Blue-faced Amazon (*Chrysotis bouqueti*, Bechstein), deposited by Mr. Neville Hollaud, March 25th. We obtained by purchase an example of this rare Parrot some time since (see P. Z. S. 1874, p. 323, and 1875, p. 59, pl. xi.); but the present specimen is of special interest, as it was obtained by Mr. Holland in the island of St. Lucia, West Indies, and thus solves the question of the true *patria* of this scarce species.

\* See Rev. Cat. Vert. (1872) p. 47.

† Mr. Dresser, in a recently issued part of the 'Birds of Europe,' proposes to unite this species to *Pica vulgaris*; but, as far as I can tell from an examination of the living bird, the Indian form is recognizable not only by its much larger size, but also by the different colour of the wings.

Mr. Edward R. Alston, F.Z.S., exhibited a rufous variety of the murine Dormouse, *Graphiurus murinus* (Desm.)\*, from West Africa, which had been sent to him for examination by Professor Young, of the University of Glasgow. He observed that this species varied much in the grey of the back, being more or less tinged with brown, and in the way in which the white of the lower parts sometimes passes into rufous. Hence it had been described under the various names *Myoxus coupei*, F. Cuvier †, *M. erythrobronchus*, A. Smith ‡, and *M. cineraceus*, Rüppell §; but these species had all been reunited by Smuts || and by Dr. Peters ¶. None of the descriptions, however, agreed with the coloration of the present specimen, which was of a nearly uniform dull pale rufous, passing beneath into a dark yellowish grey. It agreed perfectly, however, in all other characters with normal individuals of *G. murinus*, and was doubtless merely an extreme example of the rufous variation.

Mr. Alston also remarked that the type of *G. elegans*, Ogilby \*\*, now in the British Museum, seemed to be only a young specimen of *G. capensis*, F. Cuvier, and that consequently only two species of this genus appear to be well established.

---

A communication was read from Lieut. R. J. Wardlaw-Ramsay, F.Z.S., dated "Tonghoo, British Burmah, Nov. 22nd, 1874," containing the following remarks on his *Gecinus erythropygus* †† (P.Z.S. 1874, p. 212, pl. xxxv.):—"I have just obtained a pair of specimens of *Gecinus erythropygus*, in which the yellowish facial streak is entirely wanting. My original description was taken from a pair (♂ and ♀) in which the streak was strongly marked in the former and absent in the latter—on which ground I considered it to be a sexual distinction. Mr. Hume, in his description of this bird as *G. nigri-genis* ('Stray Feathers,' 1874, p. 446), tells us that among his specimens there is one only, and that a ♀, which has the streak; from which it would appear that both sexes are sometimes found with it, but that it is not constant in either."

---

Mr. W. B. Tegetmeier, F.Z.S., exhibited two specimens of wild-bred hybrid Pheasant between *Phasianus colchicus* and *Euplocamus nycthemerus*, lately shot in Surrey, and made the following remarks:—

"The two hybrid Pheasants exhibited resulted from the escape of a Silver Pheasant hen from confinement, and her association with the common Pheasant in a preserve.

\* Mammalogie, Suppl. p. 542 (1820).

† Hist. Nat. des Mamm. iii. pl. 251 (1822).

‡ Zool. Journal, iv. p. 438 (1829).

§ Mus. Senckenbergianum, iii. p. 136 (1845).

|| Enum. Mamm. Capensium, p. 34 (1832).

¶ Reise nach Mossambique, p. 136 (1852).

\*\* P. Z. S. 1838, p. 5.

†† It appears that this species had been previously described and figured by Mr. Elliot, in *Nouv. Archiv. du Muséum* (Bulletin), 1865, p. 76, pl. iii., as *Gecinus erythropygus* (cf. Walden, 'Ibis,' 1875, p. 148).

“They were apparently male and female; but their sex was not determined by the preserver.

“The cock is distinctly spurred, the general colour of the plumage being green and brown with bright metallic reflections. He has no sign of crest nor any trace of the pencillings of the Silver Pheasant.

“The hen is spurless, her general colour light mottled brown; the tail long and pointed and meshed, with transverse bars closely resembling those of the Sœmmerring’s Pheasant; a small pendent crest proceeds from the occiput.”

The following papers were read:—

1. On the Occurrence of *Helix coactiliata* in Trinidad; with Remarks on the Distribution of the Land and Freshwater Mollusca of that Island. By R. J. LECHMERE GUPPY, F.L.S., F.G.S., &c.

[Received March 30, 1875.]

*Helix coactiliata* was described by Férussac in the ‘Histoire des Mollusques,’ vol. i. p. 18, and figured on the 72nd plate of that work (figs. 1–5). Férussac remarks of it “Petite espèce discoïde, dont le port se rapproche un peu de celui de quelques espèces d’Europe.” Reeve also figures the shell in his Monograph of *Helix*, No. 595, and gives *H. nystiana* as a synonym. Mr. Ralph Tate, F.G.S., collected land-shells in Venezuelan Guiana in 1869; and amongst them was a *Helix* which, on comparison with specimens in the British Museum, I found to be *Helix coactiliata*. Comparing them with Férussac’s and Reeve’s figures I do not observe any essential difference, though our specimens may be a little larger than those figured. I am told, however, that the Venezuelan shell has been determined as *H. parkeri* of Tryon; but I prefer for the present to adhere to Férussac’s name. According to Férussac *H. coactiliata* has been found in Nicaragua and in Peru; and its range is now extended to Venezuela and Trinidad, it having been found by Mr. Tate in the former country and by myself in the latter island\*. The species, as noticed by Férussac, resembles certain European shells, and particularly, I think, *Helix ericetorum*. It is interesting to notice that in the same part of Venezuela where *H. coactiliata* occurs is found also the *H. labyrinthica*, a species which has been found in the Eocene of Europe, but was until lately supposed to be confined in the living state to certain parts of North America. I need hardly remind zoologists of the very great differences, or rather, I should say, the entire distinctness of the Molluscan faunas of North and South America. It is true that the fauna of the latter division of the continent, taken in a broad sense, runs as far north as Mexico

\* I am informed by Mr. T. Bland that *H. coactiliata* has also been found in Guatemala, and that Messrs. Crosse and Fischer regard *H. cordovana* and *H. suturalis*, Pfeiff., as synonyms.

and includes Central America. Amongst other Mollusca the *Helicincæ* and *Bulimi* of the latter region are of South-American types, the truly North-American fauna being characterized by the absence or comparative rarity of those genera and the development of peculiar forms of depressed and toothed *Helices*. These considerations invest with some interest the occurrence in South America of *Helix labyrinthica* and of a form so near to *H. ericetorum* as *H. coactiliata*. It is, however, well known that there are other South-American Mollusca which have affinities somewhat similar\*. I shall proceed to remark upon a few of these alliances. The South-American *Bulimus bilabiatus* finds a relation in the *B. auris-vulpina* of St. Helena. Still more curious is the distribution of so well-marked a genus as *Streptaxis*. It is found in South America, Bourbon, Rodriguez, Ceylon, India, and China. *Bulimus constrictus* of Venezuela, and a shell found by me in Trinidad and described as *B. pilosus*, have some remarkable points of resemblance to two St.-Helena shells called *B. digitalis* and *B. helena*. We may remember also that the genera *Anostoma* and *Megaspira*, found fossil in the Eocene of Europe, are living in South America †. This combination of facts is difficult of explanation when we consider that one portion of the affinities is with the early Tertiaries of Europe, and another with the existing fauna of the Indian and Chinese regions. The Miocene fauna of the West Indies exhibits similar relations. An explanation will doubtless be found; and it will probably include the hypothesis which assumes a land connexion between the opposite sides of the Atlantic in Tertiary or Cretaceous times. I have not alluded to the occurrence of two East-Indian Mollusca in the West Indies—namely *Pupa (Ennea) bicolor* in St. Thomas, Grenada, and Trinidad, and *Diplommatina huttoni* in the latter island; for one of these species may have been introduced, though there is more doubt as to that being the case with the other ‡. But from the botanical, no less than the zoological, evidence I am inclined to believe that the connexion between the eastern and western continents existed in Mesozoic times, and that it was the disruption of this connexion that determined the Cretaceous period, and caused the wide biological gap between that period and the Eocene. Some arguments on this head based on palæontological evidence will be found in papers written by me in 1866 §. But I now state the conclusion to which I have been drawn in broader terms; and I would further insist upon the proposition that the land connexion (which need not at any time have been continuous) extended from the now sunken Caribbean continent to northern Africa. For facility of explanation

\* See Forbes, cited by Woodward, Man. Moll. second edition, p. 96.

† The *Pedipes glaber* of the English Eocene is a South-American form. It belongs to that section of *Cionella* called *Leptinaria*. The *Achatina costellata* of Sowerby is a species of *Glandina*—a genus belonging to the West Indies and Central America.

‡ See Ann. & Mag. Nat. Hist. 3rd ser. vol. xx. p. 95, and 4th ser. vol. i. p. 110; also Amer. Journ. Conch. 1870, p. 308.

§ Quart. Journ. Geol. Soc. vol. xxii. p. 584, and Geol. Mag. vol. iv. (1867) p. 496.



I would refer to Professor Marcou's map showing the extent of the land which probably existed in the Jurassic period\*. If the boundary of the Atlantic land there represented be extended a little southward, so as to take in the island of St. Helena, we can form an idea of the total extent of the land which may have existed during the later Secondary and earlier Tertiary periods†. Nevertheless I cannot overlook the grave difficulties of the problem, in face more particularly of the peculiarities of the African fauna. The observations herein contained may therefore be regarded as suggestions which will be of use when the additional knowledge is forthcoming to enable us to decide on the true relations of the facts.

The species of land and freshwater mollusca known to be common to Trinidad, the West-Indian Islands, and the American continent are the following:—

<i>Stenogyra octona</i> , Chemn.	<i>Pupa (Vertigo) eyriesi</i> , Drouët.
— <i>caracasensis</i> , Reeve.	<i>Streptaxis deformis</i> , Fér.
— <i>plicatella</i> , Guppy.	<i>Succinea approximans</i> , Shuttl.
<i>Cionella lamellata</i> , Pot. & Mich.	<i>Veronicella lævis</i> , Fér.
<i>Helix ierensis</i> , Guppy.	<i>Physa rivalis</i> , Mat. & Rack.
<i>Bulinus oblongus</i> , Müll.	<i>Marisa cornu-arietis</i> , Linn.
<i>Orthalicus undatus</i> , Brug.	<i>Ampullaria urceus</i> , Müll.
<i>Bulinulus tenuissimus</i> , Fér.	— <i>effusa</i> , Müll.

The following five species have been found in Trinidad and in the Antilles, but are not known to occur on the continent:—

<i>Bulinus auris-sciuri</i> , Guppy.	Tobago.
<i>Pupa bicolor</i> , Hutton ( <i>Ennea</i> ).	Grenada, St. Thomas.
<i>Cyclotus grenadensis</i> , Shuttl.	Grenada.
<i>Cyclas incurva</i> , Guppy.	Guadeloupe.
<i>Planorbis terverianus</i> , Orb.	Cuba, &c.

*Bulinus auris-sciuri* is a race or local form of *B. glaber*, a species extensively distributed on the continent. *Pupa bicolor* is supposed with some probability to have been introduced from India. *Cyclotus grenadensis* is intermediate between the characteristic Jamaican forms and *C. stramineus* of Venezuela. The two freshwater shells are of South-American type, though the species are known from the Antilles and Trinidad only and not yet recorded from the continent.

The species found in Trinidad and on the continent, and not known to occur in the Antilles, are the following nine:—

<i>Zonites guildingi</i> , Bland.	Porto Cabello.
<i>Guppya vacans</i> , Guppy.	Venezuelan Guiana.
<i>Helix coactiliata</i> , Fér.	Venezuelan Guiana.
— <i>bactricola</i> , Guppy.	Venezuelan Guiana.
<i>Bulinulus vincentinus</i> , Pfeiff.	Carupano (Venezuela).
<i>Cylindrella trinitaria</i> , Pfeiff.	Carupano (Venezuela).

\* Marcou, Lettres sur les Roches du Jura : Paris, 1860.

† Respecting the distribution of land in the Tertiary period, see a paper by Bourguignat, in Ann. Sci. Nat. Zool. 5<sup>e</sup> ser. vol. v. (1866) p. 313 and plate 11.

- Cyclotus translucidus*, Sow. Venezuela.  
*Helicina barbata*, Guppy. Carupano (Venezuela).  
 — *lamellosa*, Guppy. Venezuelan Guiana.

When these nine species are added to those contained in the first list, we have twenty-five as the number of species ascertained to be common to Trinidad and the adjoining continent.

The list of species remaining as peculiar to Trinidad, so far as is yet known, includes the following:—

- |  |  |
|--|--|
| <i>Glandina minutissima.</i>                     | <i>Ancylus textilis.</i>   |
| <i>Spiraxis simplex.</i>                         | <i>Gunðlachia crepidulina.</i>                                   |
| <i>Zonites implicans.</i>                        | <i>Planorbis meniscus.</i>                                       |
| — <i>umbratilis.</i>                             | <i>Annicola spiralis.</i> — Jan 20 1875                          |
| <i>Hyalina alicea.</i>                           | <i>Diplommatina huttoni.</i> 20 21 22 23 24 25 26 27 28 29 30 31 |
| <i>Helix cæca.</i> — <i>Jamaica</i>              | <i>Blandiella reclusa.</i>                                       |
| <i>Bulinus pilosus.</i>                          | <i>Cistula aripensis.</i>  |
| <i>Bulimulus aureolus.</i>                       | <i>Helicina nemoralis.</i>                                       |
| <i>Pupa uvulifera.</i>                           | — <i>ignicoma.</i>   |
| <i>Simpulopsis corrugatus.</i> — <i>Trinidad</i> | <i>Cyclas punctifera.</i>  |
| <i>Amphibulima felina.</i>                       | <i>Anodon leotaudi.</i>  |

This list contains the names of twenty-two species. To it might be added *Stenogyra coronata* and *Pupa auriformis*; but as hitherto only a single specimen of each has been found, they may be regarded as doubtful; and the same reason may be given for leaving out *Autonoë riparia*.

On examination of this list the number of really peculiar forms seems to be very few. Many of the shells whose names are here included are minute, and most occur only in very restricted localities; so that even if existing in the Antilles or on the continent they might easily have escaped notice. *Glandina minutissima* is perhaps the smallest of all known land-shells, unless *Achatina iota* of Adams (to which our species seems to be allied) should prove to be less in size. *Spiraxis simplex* is akin to some of the plainer forms of *Spiraxis* found in the West Indies. The two *Zonitæ* are minute. *Hyalina alicea* may prove to be a *Macrocyclus*, as has happened in the case of *H. concolor* (*baudoni*). *Bulinus pilosus* is allied to *B. constrictus*, a Venezuelan shell, of which a variety is described in a note communicated by me to the Society. *Pupa uvulifera* is a small species belonging to a type of world-wide distribution. *Simpulopsis* is a South-American genus, having one or two species in the Antilles. It is probable that *S. corrugatus* will be found in Venezuela, if indeed it is not identical with one of the species already described from South America. *Amphibulima* (*Omalonyx*) *felina* is very close to, if not identical with, *O. unguis* of Guadeloupe. There is some doubt about the identity of the latter with the South-American *O. unguis*. Of *Ancylus textilis*, *Gunðlachia crepidulina*, and *Planorbis meniscus* it may be said that they will probably be found in South America on search; and *Annicola spiralis* may be placed in the same category. Furthermore the latter is not easy to distin-

gish from *A. candeana*, Orb., found in Cuba and Jamaica, in the latter island receiving the name of *Melania spinifera* Ad. *Diplommatina huttoni* is presumed to be identical with an Indian species, as already noticed. *Blandiella reclusa* (as well as *Hyalina alicea*) has hitherto only been found in one of the wildest and least-explored parts of Trinidad, but may very likely occur in the mountains of Venezuela. The genus *Blandiella* is intermediate between *Truncatella* and *Geomelania*, and is said to be synonymous with *Takeitia*. *Cistula aripensis*, though quite distinguishable from, is very nearly related to *Chondropoma tamsianum*, which occurs in the hills of Venezuela opposite to Trinidad along with *Cylindrella trinitaria* and *Helicina barbata*. It may be doubted whether the distinction between *Cistula* and *Chondropoma* is a real difference. *Helicina nemoralis* is allied to *H. columbiana* of Venezuela; and *H. ignicoma* is very near to *H. plicatula*, found in Cuba, Guadeloupe, &c. The two remaining freshwater bivalves of the list, though not hitherto found elsewhere, scarcely call for remark, especially when we take into consideration that, as a rule, the freshwater shells of the West Indies are of South-American types.

Thus we have seen that, with the exception of the *Diplommatina* and of *Pupa bicolor*, the molluscan fauna of Trinidad is almost entirely South American, and that very few of the species are of Antillean origin.

From the present list I have excluded *Bulimulus fraterculus* and *B. multifasciatus*—the shell considered to be the former being *B. tenuissimus*, and the *B. multifasciatus* of Trinidad being only a form of *B. vincentinus*, and not the true *B. multifasciatus* of Lamarck.

The distribution of the amphibious Pulmonata and Truncatellidæ is similar to that of the marine mollusca, and has therefore been left out of account in the foregoing paper. The following only have been found in Trinidad:—

*Melampus coffea*, Linn.

— *pusillus*, Gmel.

*Pedipes mirabilis*, Megerle.

*Siphonaria lineata*, Orb.

*Truncatella pulchella*, Pfeiff.

In conclusion I should acknowledge my obligations to Mr. Ralph Tate, F.G.S., for information as to the occurrence in South America of several species previously only known from Trinidad.

2. Note on a Variety of *Bulimus constrictus* found in Venezuelan Guiana. By R. J. LECHMERE GUPPY, F.L.S., F.G.S., &c.

[Received March 30, 1875.]

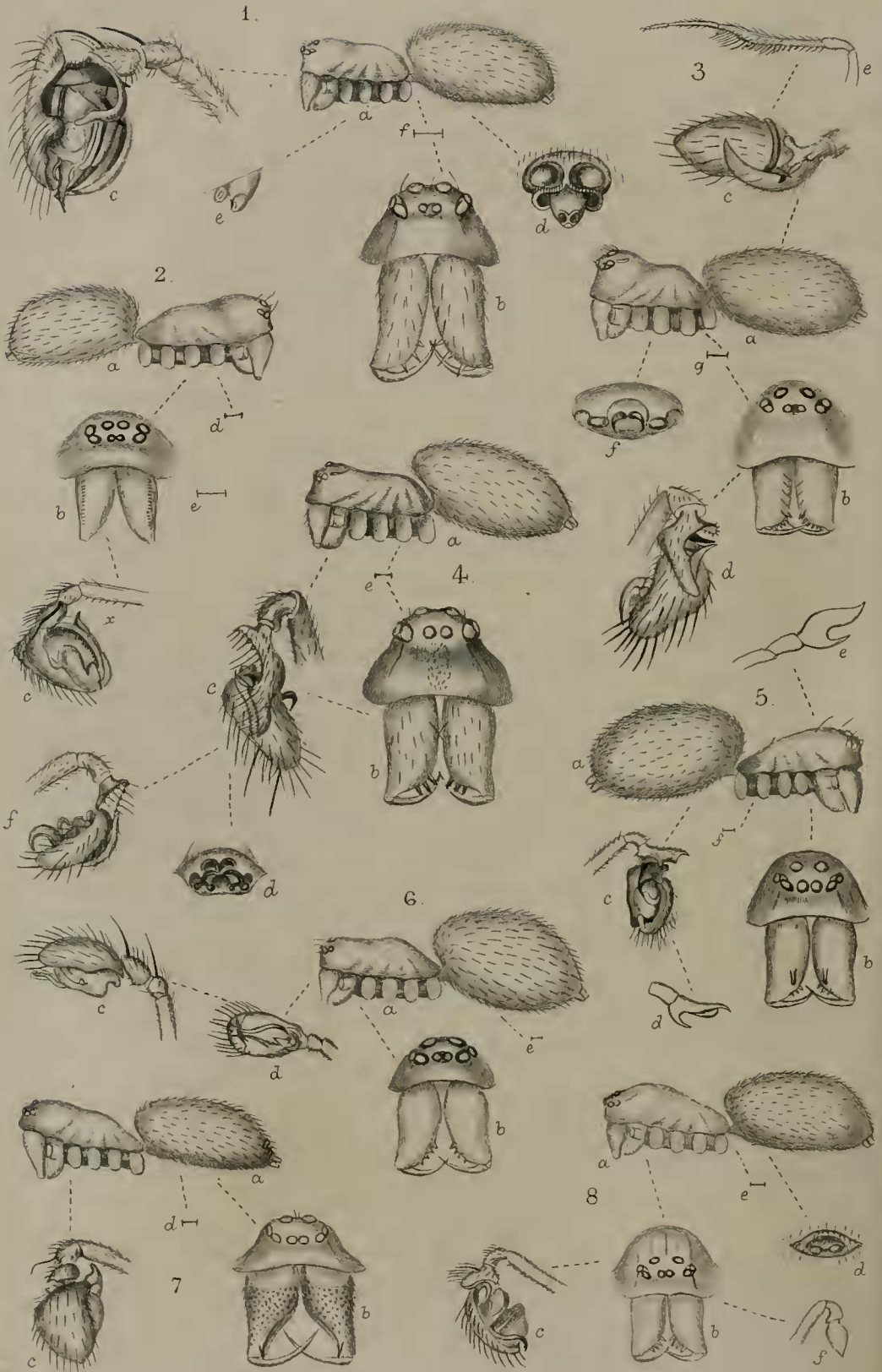
This variety may be described as follows:—

*BULIMUS CONSTRICTUS*, var. *TATEANUS*.

Shell oblong-conic, rather thin, minutely cancellate, white under







C.P. Cambridge del.  
A.T. H. Mick lith.

W. West & Co. inv.

NEW SPECIES OF ERIGONE.

a reddish brown, densely pubescent epidermis disposed in numerous fine spiral lines crossed by striæ of growth. Whorls 6, convex, gradually increasing, the last forming more than one half, the first two usually bare of epidermis and ornamented with a rugosely costellate sculpture. Suture rather deep. Aperture oval. Outer lip white, a little thickened and everted. Columella thickened and broadly reflected over the very deep umbilical perforation. Length 17, breadth 8, height of aperture 6 millimetres.

Venezuelan Guiana (*R. Tate*).

This variety is rather smaller than the type, and is apparently more densely pubescent; but the latter character may be partly due to the state of preservation of the shells. It would appear also that the cancellation and more particularly the sculpture of the apex are more strongly marked than in the type.

The nearest known relative of *B. constrictus* is, I believe, a shell described by me as *Bulimulus pilosus* (Amer. Journ. Conch. 1870, p. 310). That shell is of a lighter colour, is rather smaller, and has a less-dense pubescence. When æstivating, *B. constrictus* forms a white calcareous epiphragm, which does not happen with *B. pilosus*. The shape of both species is almost exactly that of *B. oblongus* in miniature. They seem to find their nearest allies in St. Helena, having points of resemblance to *B. digitalis* and *B. helena* of that island. The character of the apex is very peculiar; and I am informed by Mr. T. Bland that he has detected a somewhat similar feature in other *Bulimi* from the central portions of the American continent. The apex of *B. pilosus* is costellate; in *B. constrictus* it is often, though not always, somewhat rugose: these differences seem to be principally due to the more or less eroded state of that part. It was on account of the very considerable differences between these shells and those ranked as *Bulimulus* that I formerly referred them to *Buliminus*; but it is possible that they belong to neither of those genera, but form a separate group under the genus *Bulimus* (as restricted in Albers, 'Die Heliceen,' 2nd ed.). That group may retain the name of *Rhinus* (Albers, p. 223), but should perhaps be removed from *Bulimulus*, and placed, along with *Pachnodus* (*op. cit.* p. 230), or at least a part of that section, under *Bulimus*, adding to the definition of *Rhinus*, after "anfr. 6-7," the words "apice costellata vel rugoso-costellata."

### 3. On some new Species of *Erigone*.

By the Rev. O. P. CAMBRIDGE.—Part II.

[Received March 31, 1875.]

(Plate XLIV.)

The following pages comprise descriptions of nine species of *Erigone* additional to those described in a former paper (p. 190, *supra*), and all received from various localities in France. While, however, those described in the former paper were, with two exceptions, of

the genus *Walckenaëra*, Blackwall, those now described are of the genus *Neriene* of that author.

Excepting one species, all, both in the present and former papers, were sent to me by M. Eugène Simon, and were accompanied by examples of numerous other known species. A list of these latter (45 in number) with the localities in which they were found is added at the end of this paper. The whole number of species of this interesting group thus received from M. Simon amounts to seventy-nine, the greater part of them having been found in France.

*ERIGONE PABULATRIX*, sp. n. (Plate XLIV. fig. 1.)

Adult male, length nearly 2 lines.

The whole of the fore part of this Spider (except the labium and sternum, which are suffused with brown) is of a clear yellow slightly tinged with orange; the cephalothorax is of ordinary form; the caput is not raised above the thoracic level, the whole profile forming a nearly uniform gentle curve; the normal grooves and indentations are slightly marked; the clypeus is very nearly vertical, and its height exceeds (but not greatly) half that of the facial space.

The *eyes* are in the usual position; those of the hinder row are equidistant, or very nearly so, from each other; those of the fore central pair are very minute, placed on a blackish spot, and not contiguous to each other, being divided by nearly a diameter's distance, and each of them is separated from the fore lateral eye on its side by an interval equal to a diameter of the latter, and from the hind central nearest to it by a smaller interval, more nearly equal to that which separates those of the hinder row; those of each lateral pair are seated obliquely on a strong tubercle and are contiguous to each other. In one example of the male there was no tubercle on the right side, and the eyes of the lateral pair there were very minute, evidently in a semiaborted state; looked at from the front, the convexity of both rows is directed backwards, that of the hinder row the most strongly.

The *legs* are not very long, but tolerably strong, and tapering in form, their relative length being 4, 1, 2, 3. They are furnished with hairs, a very few slender spines, and some short, erect, fine bristles.

The *palpi* are short and slender (except the digital joint): the cubital and radial joints are very short; the latter is the strongest and has its fore extremity slightly produced into an obtuse point; a straight, strong, prominent, tapering, spine-like bristle, rather exceeding in length the joint itself, issues from the fore extremity of the upper-side of the cubital joint, and another longer, but less strong, and curved, springs from near the fore extremity of the radial joint, which has also a series of finer bristles round the inner margin; the digital joint is large and of an irregular oval form, the outer margin having a strong, nearly circular, prominent lobe near the middle, and its hinder extremity being prominent in a blunt angular form: the palpal organs are directed outwards, very prominent and complex, with various corneous spines and processes; among these is a large, strongly curved,

and somewhat crescent-shaped one at their base on the outer side, the upper limb of the crescent having a series of short bristly hairs on its margin, and from their extremity projects a reddish brown spiny process whose point is somewhat bifid, and near its base there is a small, curved, pointed spine; the general colouring of the palpal organs is yellowish red-brown, of different tinges, mixed with a little black on the edges of some of the processes.

The *falces* are long, strong, vertical, and rather divergent; towards the extremity of each falx, on the inner side, are three teeth rather widely separated from each other, the upper one being much the smallest.

The *maxillæ* are of moderate length, of a broad oblong form, with the outer corners of their fore extremities rounded off and a little inclined towards the labium; this latter is very short, of a somewhat semicircular form, and of a yellow-brown colour, similar to that of the sternum.

The *abdomen* is of oval form, moderately convex above, and projects a very little over the base of the cephalothorax; it is of a dull pale yellowish brown colour, and clothed (but not thickly) with hairs.

The female is larger than the male, the abdomen being much more convex above, and projecting considerably over the base of the cephalothorax; the form of the genital aperture is peculiar, and from within it there projects backwards a not very long, but strong epigyne.

Adults of both sexes of this species were received from M. Simon, by whom they were found at La Grande Chartreuse, France.

This Spider belongs to Menge's genus *Bathyphantes*, which, though difficult to characterize distinctively from either *Linyphia* or *Erigone*, will probably eventually be held to be a good genus. It certainly appears to have as much affinity with the former as with the latter; and its ultimate place will probably be that of a transitional group distinct from either.

ERIGONE SERRATA, sp. n. (Plate XLIV. fig. 2.)

Adult male, length not quite 1 line.

This Spider is very closely allied to *E. sylvatica*, Bl., but may be distinguished at once by being much smaller, by the caput being less elevated, its highest point being no higher than the thoracic junction, and also by the closer grouping of the eyes, those of the hinder row being as nearly as possible equidistant from each other, while in *E. sylvatica* the interval between those of the hind central pair is distinctly less than that between each of them and the hind lateral on its side. Owing to the less-elevated caput, the height of the facial space and clypeus is also distinctly less than in *E. sylvatica*.

In several important particulars there is a very marked similarity between the two species. Thus the present one has the peculiar, and very characteristic, longitudinal row of minute denticulations on the front of each of the falces; the palpi and palpal organs also are remarkably similar, the latter having on their outer side an almost identically shaped corneous process, whose upper edge is distinctly serrated; the cubital joint also has a similar strong, tapering, nearly



straight, spine-like bristle projecting forwards near the outer side of its fore extremity; and the digital joint is enlarged in a similar sub-angular form near its base on the inner side.

In the examples examined the colours cannot be depended upon; they had evidently not long since effected the final moult, and thus the uniform colouring was of a pale whitish straw tinge, which would, no doubt, have shortly deepened into the permanent colours of the adult spider; from such indications, however, as there were, it seemed probable that the final colours would be very like those of *E. sylvatica*.

The difference in size between these two species is very marked, the length of *E. sylvatica* (taken from several adult examples) being  $1\frac{3}{4}$  line, while that of the present Spider is nearly a line less.

While, therefore, I do not hesitate to characterize the present Spider as a distinct species, it is yet almost the only one known to me in which so great a similarity in the palpi and palpal organs is joined to so tangible a difference in the form of the caput and position of the eyes. Numerous species are known whose caput and eyes present no tangible difference, while the palpi and palpal organs are very distinct; but the converse is exceedingly rare.

Two adult males were received from M. Simon, by whom they were found at Troyes, in France, in 1871.

*ERIGONE NEMORIVAGA*, sp. n. (Plate XLIV. fig. 3.)

Adult male, length  $1\frac{1}{3}$  line.

The *cephalothorax* (as well as the *falces* and *sternum*) of this Spider are of a dull orange-yellow colour and glossy; the caput is distinctly, generally, and convexly, but not very greatly, elevated above the level of the thorax; running backwards longitudinally from behind each lateral pair of eyes is a small elongate indentation; the *clypeus*, whose height equals, if it does not exceed, two thirds of that of the facial space, is impressed below the eyes, but projects at its lower margin; and the ocular area is furnished with a few slender bristly hairs.

The *eyes* do not differ greatly in their relative size; they are in the ordinary position on the front slope of the upper part of the caput, and are all rather prominent, being seated on black tubercles; those of the hind central pair are rather nearer to each other than each is to the hind lateral on its side, being separated by a little more than a diameter's distance; those of the fore central pair are smallest of the eight, and are near together, though distinctly separated from each other; the interval between each of them and the hind central eye nearest to it is as nearly as possible equal to that between each hind central and the hind lateral on its side; those of each lateral pair are contiguous to each other and obliquely placed; and each fore lateral forms, with the fore and hind central eyes on its side, as nearly as possible an equilateral triangle.

The *legs* are rather long and tolerably strong, their relative length being 1, 4, 2, 3; they are furnished with hairs and a few short, slender, inconspicuous, erect bristles on their uppersides;

the tibiæ of the first pair are rather incrassated on the underside not far from the fore extremity, and at this part the hairs are longer, stronger, and more numerous than elsewhere; the undersides of the femora of the first pair of legs are also furnished with short, very slightly curved semispinous bristles; these characteristics of the first pair are repeated, though in a much less marked degree, in the legs of the second pair. The colour of the legs is a clear yellow.

The *palpi* are similar to the legs in colour; they are short, but rather strong, and the cubital joint is curved: the radial is very short, but has its fore extremity on the inner side produced into a long, strong, slightly curved apophysis, whose extremity points outwards; from beneath the outer side of this apophysis spring two prominent corneous projections whose independent sharp points meet in a somewhat scissor-like form: the outer side of the radial joint is also produced into a short, prominent, obtusely pointed apophysis, whose extremity is furnished with a few very short divergent bristles; and below this near the underside of the radial joint is another slightly curved corneous projection, apparently connected with the two others, whose points meet as above mentioned. The structure of this joint is very peculiar, and by no means easy to observe or describe correctly; but the particulars given, together with the figures, will, it is believed, serve to distinguish it readily from any other yet described. The digital joint is of good size, obtuse at its fore extremity, and furnished with coarse hairs. The palpal organs are prominent and rather complex, with a strong, curved, pointed corneous process towards their fore extremity.

The *falces* are moderately long and tolerably strong, being rather prominent near the middle in front, when looked at in profile; they are each furnished with two or three teeth close together near their extremity on the inner side, there being also another a little above them and rather more in front.

The *maxillæ* and *labium* are similar in colour to the legs, and present no unusual feature.

The *abdomen* is oval, tolerably convex above, glossy, but of a dull leaden black colour, sparingly clothed with hairs, and does not project very much over the base of the cephalothorax.

The *female* differs from the male in the relative length of the legs, which are 4, 1, 2, 3, instead of 1, 4, 2, 3, those of the first pair entirely wanting the distinctive characters of those of the male, while a few very slender erect spines are observable on their upper-sides; the abdomen is of a yellowish brown hue slightly suffused with blackish behind and towards the underside; it is also more densely clothed with hairs than that of the male, and (in spirit of wine) there are several pale transverse curved lines in a longitudinal series visible on the hinder part above the spinners; the form of the genital aperture is characteristic. It is possible that this may not be the female of the male above described, though it agrees sufficiently well with it in general characters.

An adult example of each sex was sent to me by M. Eugène Simon, by whom they were found at Troyes, France, in 1871.

## ERIGONE CORALLIPES, sp. n. (Plate XLIV. fig. 4.)

Adult male, length rather more than 1 line.

The *cephalothorax* is of ordinary form; its colour is a deep rich yellow-brown, slightly tinged with reddish; the caput is not elevated, being of the same general convexity as the rest of the cephalothorax; looked at in profile there is a slight hollow between the occiput and the thoracic junction: the height of the clypeus is two thirds that of the facial space; it is impressed transversely just below the eyes, and is a little prominent at its lower margin, and there is a narrow longitudinal indentation running backwards from behind each lateral pair of eyes.

The *eyes* are in the usual position, of moderate size, and do not differ greatly in their relative proportion; the hinder row is the longest and most curved, and the eyes composing it are equidistant from each other; those of the fore central pair are very near together, but not contiguous to each other, each of them is separated from the hind central eye nearest to it by an interval rather greater than that which divides the hind centrals, but equal to that which separates it from the fore lateral on its side; those of each lateral pair are seated obliquely on a strongish tubercle.

The *legs* are of a bright reddish orange-yellow colour, furnished pretty conspicuously with hairs, and a few very slender tapering erect inconspicuous bristles; they are long and tolerably strong, their relative length being 4, 1, 2, 3, those of the fourth pair being distinctly the longest; the undersides of the fore part of the tibiæ of those of the first pair are a little incrassated and furnished more thickly with hairs than other parts.

The *palpi* are not very long, but of moderate strength, and similar in colour to the legs; the cubital joint is short, and rather abruptly bent downwards: the radial joint is of very remarkable form; the margins both before and behind on the outer side, which is a little prominent, have a series of about five small tooth-like tubercles, each of which is furnished with a single bristly hair; the inner side is produced into a very long, strong, irregularly formed apophysis, the extremity of which is a little curved and not very sharply pointed; the outer margin of the extreme half is of a corneous nature, and its hinder extremity is pointed and prominent; when looked at from the front, the radial joint and its apophysis look very much like an elongated digital joint with a large and somewhat circular piece taken out of its outer side near the base; within the hollow formed by this emargination is a short, strong, curved black spiny process; the digital joint is of tolerable size, appended to the radial at some little distance from its hinder extremity; the palpal organs are complex, and (among others) have a strongly curved sharp-pointed corneous process near their extremity; the radial and digital joints are slightly tinged with brown.

The *falces* are strong and of tolerable length; they are similar to the legs in colour, and armed on the inner margin towards their fore extremities with three sharp teeth close together; the fangs are rather weak.

The *maxillæ* are of a somewhat oblong oval form, inclined (but not curved) towards the labium; they are similar in colour to the *falces*, the extremities, however, being of a whitish hue.

The *labium* is very short and of the ordinary somewhat semi-circular form, its colour being darker than that of the *maxillæ*.

The *sternum* is similar in colour to the cephalothorax, and clothed thinly with longish bristly hairs.

The *abdomen* is large, tolerably convex above, and projects well over the base of the cephalothorax; it is of a dark yellow-brown colour, and thinly clothed with fine hairs; when seen in spirit of wine it is finely mottled and marked with yellowish lines.

This Spider is nearly allied to *E. nemorivaga*, p. 326, but may be easily distinguished on comparison with the figures and description of that species.

The adult female resembles the male in colours and general characters; the clypeus, however, is lower, and the *falces* have four teeth instead of three; the form of the genital aperture is rather complex and defies description, but some idea of it may be obtained from the figure given.

I had some doubt at first whether this Spider were not identical with *Erigone paradoxa*, L. Koch, the radial joint of the male palpus being of a very similar form; but I am inclined to believe it to be quite distinct.

Both sexes were received, in January 1874, from M. Simon, by whom they have been found in several parts of France.

#### ERIGONE FLUCTUANS, sp. n.

Adult male, length 1 line.

This Spider is very nearly allied to *Erigone subtilis*, Cambr.; it may however, be distinguished by several particulars, noticed here.

The *cephalothorax* is of a yellow-brown colour, rather flat, with a very slight impression in the profile line, behind the occiput, and the hinder slope is short and very gradual; the height of the clypeus, which is vertical and has no transverse impression, is less than half that of the facial space.

The *eyes* are smaller than those of *E. subtilis*; those of the hinder row are equidistant from each other; if any thing the hind centrals may be rather nearer together than each is to the lateral of the same row on its side.

The *legs* are of a brownish yellow colour, tolerably long, slender, and furnished with hairs and a very few short strong bristles or very slender spines.

The *palpi* are short; the radial joint is stronger than the cubital, and has a small, somewhat tooth-like apophysis at its outer extremity, when looked at from the front and rather on the inner side; the digital joint is of moderate size, and has a conical prominence at its base, with its extremity directed inwards; the palpal organs are complex, but do not present any very large or remarkable processes.

The *falces* are strong and produced at the extremities, which are strongly divergent, the divergent portions excavated on the inner



sides and furnished (at the parts furthest from the fangs) with two or three minute teeth.

The *abdomen* is of a blackish yellow-brown colour.

A single example of the adult male was received, in April 1873, from M. Eugène Simon, by whom it was found near Paris.

ERIGONE VIVA, sp. n. (Plate XLIV. fig. 5.)

Adult male, length  $\frac{2}{3}$  of a line =  $1\frac{1}{2}$  millim.

The *cephalothorax* of this Spider is of a brownish yellow colour, and presents nothing remarkable in its form; the profile line is slightly but pretty uniformly curved, its highest point being at the occiput; the ocular region, as well as the median line from it backwards, is furnished with a very few prominent hairs. The height of the clypeus equals half that of the facial space, and projects a very little forwards at its lower margin.

The *eyes* are rather large, nearly equal in size, and seated on black spots, and, except those of the fore central pair, which are dark-coloured, of a bright pearly white lustre; the front row is (as is usually the case) the shortest, and (looked at from above and behind) the two rows appear equally curved from each other, forming a regular transverse oval figure; those of the hinder row are equidistant from each other, being separated by as nearly as possible an eye's diameter, those of the fore central pair (which are larger than usual, being but little smaller than the rest) are contiguous to each other, and each is separated by only a very slight interval from the fore lateral eye nearest to it; those of each lateral pair are seated obliquely on a tubercle and are contiguous to each other; thus the eyes of the lateral and fore central pairs form an almost continuous, semicircularly curved line. Each hind central eye is separated from the fore central nearest to it by an interval equal to that which divides those of the hinder row.

The *legs* are moderate in length and strength, their relative length being distinctly 1, 4, 2, 3; they are of rather a paler colour than the cephalothorax, and are furnished with hairs and slender prominent and erect bristles of various lengths and strength.

The *palpi* are similar in colour to the legs, slender and short; the cubital joint is short and bent downwards; the radial is still shorter, but has its fore extremity prominently produced into a rather long, strong, tapering apophysis, with a slightly hooked point when looked at in profile; about the middle of the outer side of this apophysis is a prominent somewhat tooth-like projection, and from the inner side of the joint projects another small pointed and slightly curved apophysis: the palpal organs are well developed, but not very complex, and directed outwards; at their base is a large red-brown and rather irregularly shaped corneous process, and at their extremity are several prominent black corneous points of different sizes.

The *falces* are similar in colour to the cephalothorax, tolerably long and strong, and nearly vertical; each has a strong curved but not very sharp tooth in front on its inner side towards the ex-

tremity, directed downwards, and below it, on the inner margin, are two or three minute ones.

The *maxillæ* are similar in colour to the falces, rather long and strong, straight, and inclined towards the labium; on the outer side of each are two or three longish bristles springing from minute tubercles.

The *labium* is short and broad, rather pointed at its apex, and similar to the *maxillæ* in colour.

The *sternum* is of the ordinary heart-shape, tolerably convex, furnished with a few bristles, and of a yellow-brown colour.

The *abdomen* is short oval, and tolerably convex above; it is clothed thinly with hairs, and is of a yellowish brown colour tinged with olive.

Adult examples of the male were received from M. Simon, by whom they were found at Chaville near Paris, and also at Troyes.

ERIGONE DILUTA, sp. n. (Plate XLIV. fig. 6.)

Adult male, length  $\frac{2}{3}$  of a line.

The whole of the fore part of this Spider is of a bright straw or pale orange-yellow colour, the sternum, however, being a little suffused with sooty brown; the form of the cephalothorax is ordinary, the occiput and thoracic junction being on nearly the same level, and between them is a very slight depression; the height of the clypeus, which projects a very little forwards below, equals half that of the facial space.

The *eyes* are of tolerable size, rather large for the genus, and do not differ very greatly in size; they are seated on black spots in the usual position; the hinder row is the longest and most curved, the front row being nearly straight; the eyes of the hind central pair are divided from each other by an eye's diameter, but are further from each other than each is from the hind lateral on its side, to which last it is in fact almost contiguous; those of the fore central pair are smallest of the eight, dark-coloured, and very inconspicuous, contiguous to each other, and each is removed from the fore lateral on its side by but a very small interval; the interval between each fore central and the hind central eye on its side is equal to that which divides the eyes of the hind central pair.

The legs are neither very long nor strong; their relative length is 4, 1, 2, 3, and they are furnished pretty thickly with rather coarse hairs and slender bristles.

The *palpi* are short and slender; the cubital and radial joints are both very short; the latter is a little produced at its fore extremity on the upperside in a blunt-pointed form, but has no distinct projection or apophysis; each of these joints, besides some other hairs, has a single tapering black bristle projecting forwards from near the fore extremity of its upperside; the digital joint is not large, and its form is oval; the palpal organs are well developed but not very complex, consisting of a smooth oval whitish lobe and several corneous spines, one of which, of a pale colour and somewhat slender and sinuous form, issues from the base of the palpal organs, and, passing over their entire length, projects beyond their fore extremity.

The *falces* are tolerably long and strong, and somewhat divergent towards their extremity, near which on the inner margin are several very minute teeth.

The *maxillæ*, *labium*, and *sternum* are of ordinary form.

The *abdomen* is short oval and pretty convex above; its colour is a pale dull luteous brown, having a mottled appearance; and it is thinly clothed with rather coarse longish hairs.

This species is nearly allied to *E. viva* (p. 330); but, among other distinctions, the difference in the relative position of the eyes of the hinder row, as well as the structure of the palpal organs, and absence of the strong tooth in front of the *falces*, will readily distinguish it.

Adult males were received from M. Simon, by whom they were found at Troyes in France.

#### ERIGONE GROUVELLII, sp. n. (Plate XLIV. fig. 7.)

Adult male, length 1 line.

The *cephalothorax* of this Spider is of ordinary form; the profile describes a tolerably uniform gentle curve, with a very slight depression between the occiput and the thoracic junction, the caput not being elevated above the general level. The height of the clypeus is scarcely equal to half that of the facial space; the normal grooves and indentations are visible, but not very strongly marked; and some portions, if not the whole, of the surface, are very finely rugulose or striated with minute wrinkle-like markings. The colour of the cephalothorax is a deep yellow-brown, tinged with black; and the caput has a very few hairs along its median line.

The *eyes* are in the usual position, not very small, nor differing greatly in their relative size; the front row is rather the shortest; and both rows curve away from each other, forming a pretty regular oval figure; the eyes of the hinder row are very nearly equidistant from each other, the interval between the centrals being perhaps rather less than that which divides each from the lateral eye on its side; those of the fore central pair are near together but not contiguous to each other, the interval between them being about half that which separates each from the fore lateral on its side; those of each lateral pair are placed slightly obliquely on a tubercle; the interval between each of the hind central eyes and the fore central nearest to it is distinctly greater than that which divides the eyes of the hind central pair, and a little greater than that which separates each of these from the hind lateral on its side.

The *legs* are slender and of tolerable length; they are of a dull yellow colour, the femora being tinged with orange, and are furnished with hairs and a few slender spine-like bristles.

The *palpi* are short, moderately strong, of a duller hue than the legs, and furnished with a few hairs: the cubital and radial joints are very short; the former is bent and has a single strongish, tapering, prominent, slightly sinuous black bristle a little above its fore extremity on the upperside; the radial joint is stronger than the cubital, with one or two slight prominent points at its fore extremity on the upperside; the digital joint, which is of a dark black-brown

colour, is of tolerable size and has a slightly prominent lobe near the middle of its outer side, and above this, towards its base, there is a subangular prominence; the palpal organs are well developed, prominent, and complex; among other corneous processes is a largish one which projects backwards from near their base, and is of a somewhat bent, blunt-pointed, conical form.

The *falces* are long, strong, and divergent, considerably cut away or excavated towards their inner extremities, and a large portion of their front surface is thickly marked with small granulosities or slight tubercles, from some (if not all) of which there issues a single short bristly hair; on both the upper and underside of the extremity of each falx is a single tooth, between which two teeth the fang, which is long and strong, lies.

The *maxillæ* and *labium* are, like the falces, of a deep brown colour, tinged with yellowish, the colour of the *sternum* being much blacker.

The *abdomen* is of a rather slender oval form, black, glossy, and clothed sparingly with hairs; just above the spinners are several transverse curved folds or wrinkles in the skin, in a longitudinal series.

This Spider is very nearly allied to *Erigone rurestris*, Koch., = *E. fuscipalpis*, cj., = *Neriene gracilis*, Bl., + *N. flavipes*, Bl., and might be easily mistaken for it by its general characters of size, colour, and structure; but the tuberculous frontal surface of the falces and the corneous projection at the base of the palpal organs, particularly noted above and shown in figure 7, *b* & *c*, will, among other differences, serve to distinguish it at once.

A single example was received from M. Eugène Simon, by whom it was found on the Col de Natoia, between Embrun and Barcelonette, in 1872.

#### ERIGONE PÆTULA, sp. n. (Plate XLIV. fig. 8.)

Adult male, length rather less than 1 line.

The *cephalothorax* is of a dull yellow-brown colour, broadly radiated in the thoracic region with dark blackish brown lines, showing the direction of the converging indentations; an indistinct curved blackish line runs backwards from each of the lateral pairs of eyes, converging towards the occiput, and another, more strongly defined, runs backwards from the hind central eyes to the thorax; this line is dilated on the occiput into a somewhat arrow-headed marking, the point of which is directed backwards: the caput is large, the occipital region being the highest part of the cephalothorax, whence the profile line slopes both forwards and backwards without any depression; the cephalothorax has thus a humpbacked appearance; the clypeus is vertical, and its height is equal to half that of the facial space.

The *eyes* are in the ordinary position at the extremity of the front slope of the caput; they are small and do not differ greatly in their relative size. Those of the hinder row are equidistant from each other, the interval a little exceeding an eye's diameter; the front row is shorter than the hinder one, the eyes of each lateral pair being obliquely placed; those of the fore central pair are smallest of the eight and contiguous to each other, the interval between each of



them and the hind central eye nearest to it being rather less than that which divides those of the hinder row.

The *legs* are of tolerable length and slender; they are furnished with hairs and a very few fine spines or spine-like bristles. Their relative length appeared to be 4, 1, 2, 3, and they are of a dull brownish-yellow colour.

The *palpi* are slender, moderately long, and similar in colour to the legs; the cubital joint is short and bent downwards; the radial is stronger, gradually dilated towards its extremity, and has its fore extremity very slightly produced, ending in a blunt point; the digital joint is of moderate size; and the palpal organs are prominent and rather complex.

The *falces* are of ordinary length and strength; they are nearly vertical, rather lighter in colour than the cephalothorax, and armed with four small teeth on the inner sides towards their extremity.

The *maxillæ* and *labium* are of ordinary form, and similar to the falces in colour, that of the *sternum* being strongly marked and suffused with black.

The *abdomen* is of a rather slender oval form and moderately convex above; it is of a glossy black colour and sparingly clothed with fine hairs.

The female resembles the male in both form and colour, the teeth of the falces, however, being longer and stronger; the form of the genital aperture is simple but characteristic.

This species is allied to *Erigone rurestris*, Koch; but the hump-backed form of the cephalothorax distinguishes it at a glance.

Adults of both sexes were received from Mr. Eugène Simon, by whom they were found in the French Alps, at Monitier, Lautares, in 1873.

#### DESCRIPTION OF PLATE XLIV.

Fig. 1. *Erigone pabulatrix* ♂ & ♀, p. 324.

*a*, profile; *b*, caput and falces, from the front; *c*, left palps (♂), from the outer side; *d*, genital aperture of ♀; *e*, ditto, in profile; *f*, natural length of ♂.

2. *Erigone serrata* ♂, p. 325.

*a*, profile; *b*, caput and falces, from the front; *c*, left palpus, from the front and rather on the outer side; *d*, natural length of Spider; *e*, ditto of *Erigone sylvatica*, a very closely allied species.

3. *Erigone nemorivaga* ♂ & ♀, p. 326.

*a*, profile; *b*, caput and falces (♂), from the front; *c*, right palpus (♂), from inner side and above; *d*, left palpus (♂), from inner side and in front; *e*, left leg of first pair, from the outer side (♂); *f*, genital aperture (♀); *g*, natural length of ♂.

4. *Erigone corallipes* ♂ and ♀, p. 328.

*a*, profile; *b*, caput and falces, from the front; *c*, right palpus (♂), from inner side and in front; *d*, ditto, from outer side and underneath; *e*, genital aperture (♀); *f*, natural length (♂).

5. *Erigone viva* ♂, p. 330.

*a*, profile; *b*, caput and falces, from the front; *c*, right palpus, from outer side; *d*, portion of left palpus, from inner side; *e*, ditto, from inner side and behind; *f*, natural length of Spider.

6. *Erigone diluta* ♂, p. 331.

*a*, profile; *b*, caput and falces, from the front; *c*, right palpus, from

inner side; *d*, left ditto, from underneath on inner side; *e*, natural length of Spider.

Fig. 7. *Erigone grouvellii* ♂, p. 332.

*a*, profile; *b*, caput and falces, from in front; *c*, right palpus, from inner side in front; *d*, natural length of Spider.

8. *Erigone petula* ♂ & ♀, p. 333.

*a*, profile; *b*, caput and falces (♂), from the front; *c*, left palpus (♂), from outer side; *f*, portion of ditto, from inner side in front; *d*, genital aperture (♀); *e*, natural length (♂).

LIST OF KNOWN SPECIES OF ERIGONE COMPRISED IN THE  
VARIOUS COLLECTIONS RECEIVED FROM M. SIMON.

WALCKENAËRA, Blackw.

- Erigone simonii*, Cambr. Paris.
- *præcox*, Cambr. Troyes.
- *pallens*, Cambr. Briançon, Sappey, and Le Monitier, Hautes-Alpes.
- *depressa*, Bl. Corsica.
- *brevipes*, Westr. Cols des Ayes, Hautes-Alpes, France.
- *insecta*, L. Koch. Troyes.
- *unicornis*, Cambr. Troyes.
- *monoceros*, Wid. Glacier du Casset, Troyes, and Corsica.
- *scabricula*, Westr. Paris.
- *elegans*, Cambr. Paris.
- *beckii*, Cambr. Troyes.
- *pusilla*, Westr. Sappey (near Grenoble).
- *humilis*, Bl. Corsica.
- *cristata*, Bl. Savines.
- *fuscipes*, Bl. Dieppe.
- *avicula*, L. Koch. Le Monitier, Hautes-Alpes.
- *pumila*, Bl. Troyes.
- *parallela*, Bl. Paris and Hautes Alpes.
- *obscura*, Bl. Troyes.
- *latifrons*, Cambr. Sappey.
- *fastigata*, Bl. Near Paris.
- *capito*, Westr. Paris and Bourg d'Oisans.
- *cueullata*, C. Koch. Grenoble.
- *blackwallii*, Cambr. Col de Buffère, Casset, Hautes-Alpes.
- *nemoralis*, Bl. Troyes.
- *straminea*, Menge. Faillefeu, Basses-Alpes.

NERIENE, Bl.

- Erigone sila*, Cambr. Paris, and Le Galivier, Hantes-Alpes.
- *bicuspis*, Cambr. Paris.
- *retusa*, Westr. Paris, Digne (Basses-Alpes), and Troyes.
- *herbigrada*, Bl. Sappey.
- *intercepta*, Cambr. France.
- *alpigena*, L. Koch. Le Monitier.
- *rubens*, Bl. France.
- *isabellina*, C. Koch. France.
- *fuscipalpis*, C. Koch. Various localities in France.
- *penicillata*, Westr. Troyes.
- *sundevallii*, Westr. Orne (Normandy) and Corsica.
- *subtilis*, Cambr. Col de Buffère, Hautes-Alpes.
- *agrestis*, Bl. Sappey.
- *vigilax*, Bl. Eychanda, Buffère, Lac Blanc, Jura.
- *pygmæa*, Bl. Bourg d'Oisans.
- *neglecta*, Cambr. Troyes.
- *vagans*, Bl. Col des Ayes, Hautes-Alpes.
- *pallipes*, Cambr. Villers sur mer, Normandy.
- *brevipalpis*, Menge. Sappey.

4. Sketches of the Spermatozoa of *Petromyzon*.

By GEORGE GULLIVER, F.R.S.

[Received April 7, 1875.]

In my paper "On certain Points in the Anatomy and Economy of the Lampreys," published in 1870 (P. Z. S. 1870, p. 844), there is an engraving of the spermatozoa of *Petromyzon planeri*. But I know not that those of *P. marinus* have ever been described or depicted; and as they differ curiously in the two species, sketches of them are here given.



4000<sup>ths</sup> \_\_\_\_\_ of an Inch

Fig. 1. Spermatozoa of *Petromyzon marinus*; fig. 2. Spermatozoa of *P. planeri*. The scale is divided into ten parts, each one of which stands for  $\frac{1}{4000}$  of an English inch.

The spermatozoa of *P. marinus*, notwithstanding the great size of the species, are much the smallest, and have a distinct and rounded head. Their mean length is about  $\frac{1}{4000}$  inch, and their thickness  $\frac{1}{48000}$ . They were obtained from a fish 32 inches in length and three pounds in weight, taken on the 12th of May, 1874, in the river Stour, near Sturry Mill, about two miles below Canterbury. The milt, which distended the whole abdomen from the pericardium to the anus, was a soft pulpy mass chiefly composed of a creamy semen, and so rich in, and crowded with, spermatozoa of such minuteness that they were with difficulty distinguishable; and it was not before the semen had been much diluted and placed under Powell and Lealand's  $\frac{1}{16}$  objective that a good view of them was obtained. Under a lower power, especially in the pure semen, nothing more than congeries of indistinct rounded points appeared, like those which I have described in the 'Proceedings' of this Society (P. Z. S. 1842, p. 99), as the "molecules of the semen." In short, unless great care be taken, the spermatozoa in the ripe testis are so very faint, minute, and abundant, that they are likely to escape detection.

But the spermatozoa of the little *Petromyzon planeri* are much larger and more easily seen. They are club-shaped, without a distinct head, and have an average length of  $\frac{1}{2000}$  inch, and a thickness of  $\frac{1}{30000}$ . They were obtained in April from a fish 6 inches in length and 2 drachms in weight. Further details concerning the generative organs of both sexes are given in the paper first quoted in the present communication.

5. Contributions to a History of the Accipitres, or Birds of Prey. By R. BOWDLER SHARPE, F.L.S., F.Z.S., &c., of the Zoological Department, British Museum. Notes on the rarer Accipitres of Australia.

[Received April 19, 1875.]

The specimens which I have the pleasure of exhibiting before the Society to-night have all been collected in the interior of Queensland by Mr. J. B. White, a gentleman whom Mr. Ramsay has already introduced to the notice of ornithologists as the discoverer of the egg of *Chlamydodera maculata* (*vide* P. Z. S. 1874, p. 605). During a recent visit to England Mr. White submitted his series of Accipitres to me; and I found so many interesting birds among them, many in stages of plumage hitherto unknown and undescribed, that I have put together a few notes on the most important species.

*ERYTHROTRIORCHIS RADIATUS* (Lath.).

*Urospizias radiatus*, Sharpe, Cat. B. i. p. 159.

Mr. White has an adult male and a young female of this interesting bird; and it is quite evident that my measurements, taken from a supposed female bird in the Museum collection, were wrongly given by me in the 'Catalogue.' Mr. White's birds measure as follows:—

♂ ad. Total length 20·5 inches, culmen 1·35, wing 14·9, tail 9·2, tarsus 3.

♀ jun. Total length 24·5 inches, culmen 1·6, wing 16·9, tail 10·5, tarsus 3·25.

*Young female.* Larger than the male, as will be seen by the measurements, and immensely more powerful in the talons. Above tolerably uniform brown, the hind neck mottled with white bases to the feathers, a few of the feathers on the hind neck and upper wing- and tail-coverts showing the characteristic bright rufous margins; median and greater wing-coverts shaded with ashy grey, and barred across with dark brown, exactly like the secondaries, which are outwardly greyish with four distinct bands of dark brown, the tips of the feathers whitish; the primary coverts and primaries greyish, barred with blackish, about nine bands being distinguishable on the latter; on all the feathers of the rump and upper tail-coverts are indications of concealed greyish white cross bars, many of the latter being also tipped with white; tail-feathers grey, narrowly tipped with white and crossed with nine bands of blackish brown, increasing to ten in number on the outer tail-feathers; sides of face brown, the lower ear-coverts streaked with white; cheeks and throat white, distinctly streaked with blackish brown; all the rest of the under surface broadly streaked with blackish brown, the chest washed with tawny; the centre of the body white, the flanks greyish, many of the feathers margined with bright rufous; thighs entirely bright rufous, entirely uniform; vent and under tail-coverts whitish, with narrow blackish



shaft-lines, the vent-feathers slightly washed with bright rufous, the under tail-coverts mottled with ashy frecklings; under wing-coverts bright rufous, with broad central arrow-head markings of black, the lower series grey, barred with blackish brown, exactly resembling the inner lining of the quills.

Mr. Gurney has pointed out to me an error that I made in adopting this species as the type of Kaup's genus *Urospizias*, whereas Kaup intended his type of that genus to be the *Astur radiatus* of Temminck (*nec* Lath.)=*A. approximans*. I overlooked this by some mistake; and as this Red Harrier Buzzard is really generically distinct, I adopt the name of *Erythrotriorchis*, with which Mr. Gurney proposes to supplant *Urospizias* of my 'Catalogue.'

LOPHOICTINIA ISURA (Gould): Sharpe, Cat. p. 327.

The receipt of a specimen in Mr. White's collection shows that the bird supposed by me to be the young (p. 327) is not really immature; and I subjoin a description of a very young bird, which I now exhibit.

Above purplish black, broadly tipped with tawny rufous, shading off into buff on the extreme margin; lower back and rump pale brown, broadly tipped with tawny rufous, especially on the under tail-coverts, which are barred and mottled with darker brown, being whitish at the base and for the greater part of the outer web; tail slaty grey, tipped with buffy white and barred with six blackish bands, the subterminal one broader; upper wing-coverts purplish brown, broadly barred with tawny rufous, particularly broad on the outermost of the least series, which are mesially streaked with blackish brown, the greater coverts whitish near the base and barred with the same on the inner web; primary coverts uniform purplish brown, tipped with tawny; quills purplish black, tipped like the coverts, the primaries inclining to slaty grey and barred with blackish on the inner webs; entire head, neck, and underparts bright tawny, the feathers centred with black streaks, narrower on the throat and chest, and disappearing on the abdomen and flanks; frontal feathers and chin indistinctly whitish; ear-coverts more thickly streaked with blackish, giving them a dingy appearance; upper wing-coverts coloured like the breast, the lowest series ashy black, inclining to greyish white at base, and resembling the inner lining of the quills.

NISAETUS MORPHNOIDES (Gould): Sharpe, Cat. i. p. 254.

The bird figured by Mr. Gould and described by him as adult is most probably the young. At all events it is of the same plumage as the brown specimens of the Booted Eagle of Europe, which are generally shown to be immature. Mr. White has now sent me the adult bird, a skin of which he has very kindly presented to the Museum; and he tells me that the brown birds are far rarer than the white-breasted ones. As might be expected, the present specimen much resembles an ordinary white-breasted *N. pennatus*; but it has the unflinching character of the barred quill-lining by which I first

distinguished the species, and it has a tolerably distinct crest. I subjoin a description of this adult bird:—

*Adult.* Above clear brown, with a purplish shade, many of the feathers with paler edgings, especially the upper wing-coverts; spurious quills and primary coverts uniform purplish black, with a very slightly indicated whitish tip; quills purplish brown, barred across with black on the inner web, these black bars more distinct on the secondaries, which are paler and are barred across, the tips being conspicuously white, the innermost secondaries uniform pale brown like the back; lower back and rump rather darker brown; the upper tail-coverts very light, tipped and barred externally with white; tail grey, tipped with white, and crossed with eight blackish bars, the subterminal one rather the broadest; forehead whitish; crown of the head purplish black, the feathers lanceolate and forming an occipital crest; sides of the face and neck all round tawny-coloured, with mesial black shaft-streaks to all the feathers; the ear-coverts rather more dingy brown but narrowly streaked with black in the same manner, these streaks much broader on the cheeks and forming a distinct moustache; under surface of the body white, the feathers streaked with black on the throat and chest, these streaks disappearing gradually on the abdomen; many of the throat- and breast-feathers washed with pale tawny, as also the flanks—the abdomen, thighs, and under tail-coverts having very few of these markings and being nearly uniform white; upper wing-coverts white, with a few brown streaks, the innermost deep chestnut, streaked with black. Total length 21 inches, culmen 1·65, wing 15·7, tail 9·7, tarsus about 2·85.

GYPOICTINIA MELANOSTERNA (Gould): Sharpe, Cat. B. i. p. 335.

A specimen of this extremely rare Kite is in the collection; and I have the pleasure of exhibiting it to the Society. It will be seen from the tarsus with its scaled hinder aspect and its long wings that the bird is a Kite and not a Buzzard at all. Mr. Gould's plate in the 'Birds of Australia' does not show these peculiarities, and gives a wrong idea of the bird in consequence.

Besides the Hawks above mentioned, Mr. White collected specimens of *Falco subniger*, *F. hypoleucus*, *F. lunulatus*, and the rarer *Striges*, such as *Strix tenebricosa*, &c.

6. On the Disposition of the Deep Plantar Tendons in different Birds. By A. H. GARROD, B.A., F.Z.S., Fellow of St. John's College, Cambridge, Prosector to the Society.

[Received March 30, 1875.]

The arrangement of the tendons in the palm of the hand and the sole of the foot among the Mammalia is a subject of great intricacy, as

may be inferred from the comparison of the dissections of different animals whose anatomy has been sufficiently investigated. Among birds peculiarities in the disposition of the plantar tendons has already attracted the attention of Prof. C. J. Sundevall, who, as is well known, divides the Passeres off from all other orders, and includes *Upupa* with them, because in them, and in them only, the tendon of the *flexor longus hallucis* muscle is quite independent of that of the *flexor perforans digitorum*; whilst in other birds the former joins the latter, so preventing the two from being quite independent in their action. All other descriptions which I have seen of special dissections have been confirmatory of this view; and my own observations, with but a slight exception in the case of *Botaurus*, to be mentioned below, support Prof. Sundevall's separation off of the Passeres together with *Upupa* on this particular character. My dissections, however, have shown me that there is still more to be learnt from the plantar tendons, and that the large mass of birds which all agree in that the two above-mentioned deep flexors blend together, present among themselves peculiarities as important as that which so definitely characterizes the Passeres. To describe and to endeavour to show the bearing of these differences are the objects of the present paper.

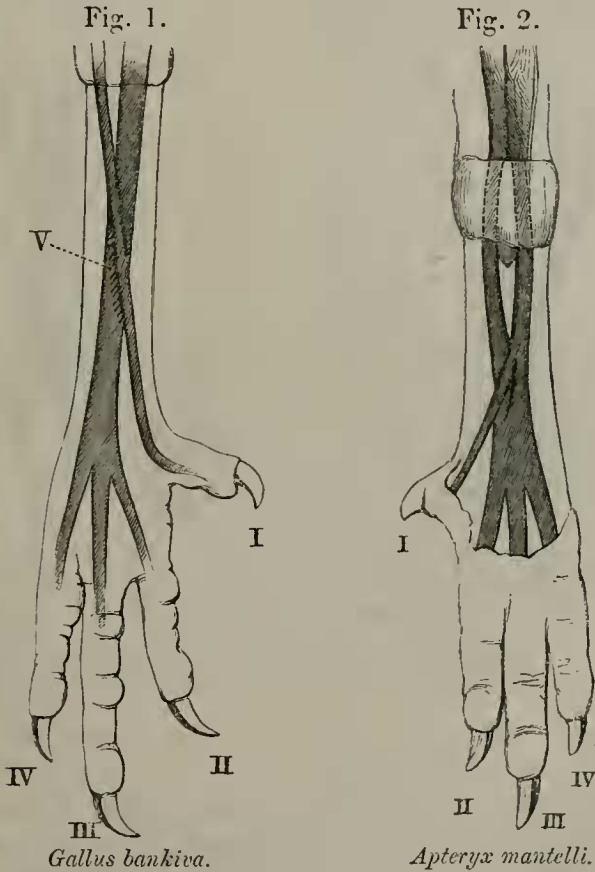
In birds generally, whatever the number of their toes, there are two muscles whose fleshy bellies are situated in the leg proper (that is, between the knee and the ankle), deep, and just behind the tibia. These muscles arise, one from almost the whole of the posterior surface of the tibia and from the fibula, in a bipenniform manner, and the other from the inferior surface of the horizontal femur, just behind the outer genual articular condyle. The former is termed the *flexor perforans digitorum pedis*, because its terminal tendons perforate those of the more superficial flexors on their way to the ungual phalanges of their respective toes; and the latter is termed the *flexor longus hallucis*, because there is generally a shorter muscle to the same digit.

These two muscles descend to the ankle (the joint between the tibio-tarsus and the tarso-metatarsus) side by side; they run behind it, in the fibro-cartilaginous or osseous mass which, in birds, is always found at the posterior part of the upper end of the tarso-metatarsus, in two canals, deeper than any of the other flexor tendons; and in these canals there is always a definite relation between them. Sometimes the tendons are side by side; and then it is always that of the *flexor longus hallucis* which is the external of the two, the osseous vertical ridge, which is nearly always seen in the dry bone, separating them. Sometimes, however, one is superficial or, in other words, posterior to the other. When this is the case it is always the *flexor perforans digitorum* which is the deeper. In the Swifts, for instance, the *flexor longus hallucis* quite covers the *flexor perforans digitorum*; but in most Parrots, as may be seen by the disposition of the osseous canals in the dry tarso-metatarsus, that for the former muscle is external as well as superficial, only partially covering it.

These relations are constant, and must be always borne in mind

in all attempts to identify the muscles. From these it can be inferred, as is verified by dissection, that the tendon of the *flexor longus hallucis* crosses its companion superficially on its way from the ankle to its insertion in the hallux.

Just before, or just at the commencement of, the sole of the bird's foot (near the joint between the metatarsus and the phalanges), these two tendons generally split up to supply the toes. By far the majority of the families of birds agree in the distribution of the terminal tendons, conforming to one common type. This typical arrangement must be first described. The common Fowl (*Gallus bankiva*) is a very good example. The accompanying diagram (fig. 1) will



assist in explaining it. The tendon of the *flexor longus hallucis* descending on the outer side of the tendon of the *flexor perforans digitorum*, crosses it superficially in its downward and inward course to the lower surface of the base of the hallux, whence it traverses the flexor surface of that digit to the base of the unguis phalanx, at which spot it is inserted. The *flexor perforans digitorum* continues down to the sole of the foot as a single tendon, where it immediately splits into three parts, one to the unguis phalanx of each of the three anteriorly directed digits. Opposite the lower part of the tarso-



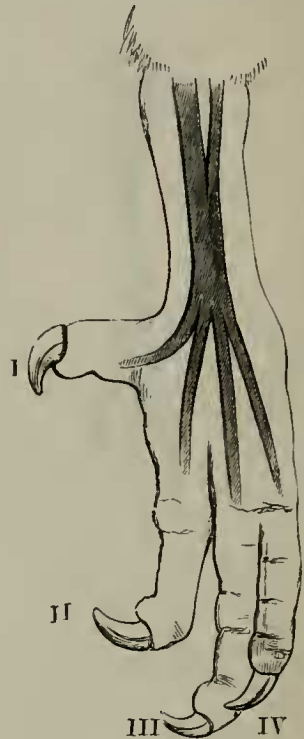
metatars the *flexor longus hallucis* sends downwards a fibrous vinculum (V) which joins the *flexor perforans digitorum* tendon just before it commences to trifurcate. In all cases this vinculum is always directed downwards from the hallux-muscle to the digits-muscle, so that, when the tendon of the *flexor perforans digitorum* alone is pulled upon, the three anterior digits alone are flexed; but when the *flexor longus hallucis* is put in action, the digits as well as the hallux are simultaneously flexed.

The proportion borne by this vinculum to the main tendon of the *flexor longus hallucis* varies considerably. In some birds it is com-

Fig. 3.

*Tinnunculus alaudarius.*

Fig. 4.

*Buceros rhinoceros.*

paratively feeble and insignificant; whilst in others, with but a small hallux, it is much larger than the hallucial moiety, and seems to be the main continuation outwards of the insertion of the muscle into that of the *flexor perforans digitorum*, the slip to the great toe being but small compared with it. In the Dorking Fowl the *flexor longus hallucis* tendon splits into two (after it has given off the vinculum to the *flexor perforans*), one resulting portion going to the normal hallux and the other to the supplementary toe, which is therefore a hallux also, as is generally supposed.

This manner of distribution of the deep plantar tendons, which is that found in a great number of birds, may be summarized as follows:—The *flexor perforans digitorum* splits opposite the meta-

tarso-phalangeal joint into three tendons, one running to the unguis phalanx of each of the three anteriorly directed toes. The *flexor longus hallucis* is inserted into the unguis phalanx of the hallux, but it sends downwards near the middle of the tarso-metatarsus a vinculum to join the tendon of the *flexor perforans digitorum* just before the trifurcation of that muscle (figs. 1 and 7).

This condition is found in the following birds which I have examined:—

<i>Gallus bankiva.</i>	<i>Baza lophotes.</i>
<i>Megacephalon maleo.</i>	<i>Syrnium aluco</i> (vinculum very broad).
<i>Fulica atra.</i>	
<i>Musophaga violacea.</i>	<i>Leptoptilus argala.</i>
<i>Schizorhis africana.</i>	<i>Ardea sumatrana</i> (vinculum very slender).
<i>Crotophaga sulcirostris.</i>	— <i>cinerea</i> (vinculum scarcely exists).
<i>Phœnicophæus, sp.?</i>	
<i>Eudynamis orientalis.</i>	<i>Cancroma cochlearia.</i>
<i>Cuculus canorus.</i>	<i>Geopelia cuneata.</i>
<i>Nestor notabilis.</i>	<i>Ibis rubra.</i>
<i>Chrysotis festiva.</i>	<i>Platalea ajaja.</i>
— <i>ochrocephala.</i>	<i>Eurypyga helias.</i>
<i>Ara chloroptera.</i>	

In *Ardea cinerea* and in *A. sumatrana*, here mentioned, the vinculum is stated to be extremely feeble. In *Botaurus stellaris* this condition is carried a step further, the vinculum being quite wanting. Prof. Sundevall states that such is the case only in the Passeres and in *Upupa*; here, however, is a slight exception to that generalization.

Frequently the vinculum above referred to is so considerable in strength that it makes the *flexor longus hallucis* appear to fuse with the *flexor perforans digitorum*, and only to send a slip before doing so to the hallux. This condition is evidently but an inconsiderable modification upon the previously described typical arrangement (fig. 2, p. 341). It is, however, a stepping-stone to others, which it assists in explaining. It is found in the following birds, which I have dissected (it will be noticed that they have the hallux comparatively insignificant):—

<i>Apteryx mantelli.</i>	<i>Cygnus nigricollis.</i>
<i>Nothura maculosa.</i>	<i>Podiceps minor.</i>
<i>Chenalopez ægyptiacus.</i>	<i>Phalacrocorax carbo.</i>

In many of the Accipitres diurnæ a slight modification of this arrangement is observed. The *flexor longus hallucis* divides into two moieties opposite the lower end of the tarso-metatarsus, one of which runs to the hallux. The other part is the representative of the vinculum of the above-mentioned birds; it is peculiar, however, in that, instead of joining the tendon of the *flexor perforans digitorum* before it is distributed to the anterior toes, it mostly runs down to blend with the slip which is associated with the inner of these (digit 2) only (fig. 3). This condition I have observed in

*Haliaëtus albicilla,* *Tinnunculus alaudarius.*

In *Geranoaëtus aguia* and in *Polyborus brasiliensis*, besides the

special tendon from the hallux-musele to the second digit, there is a broad thin vinculum present, as in *Gallus*. In the Accipitres Diurnæ the arrangement of the tendons therefore differs in different groups—in *Baza* their distribution being quite normal, that is as in the first-described manner; in *Polyborus*, *Haliaëtus*, *Tinnunculus*, and *Geranoëtus* this condition is combined with a special extra tendon to the second digit, which greatly increases its power of flexion. The arrangement observed in the Cathartidæ is in no way allied to any of these, and adds another important point to the many now known to separate them off entirely from the Accipitres veræ.

The next arrangement to be described is a very different one. The two deep flexors descend beyond the ankle-joint independently, as usual; after passing which, generally about one third down the tarsometatarsæ, they blend completely, *before* any slip has been given off. From the conjoined tendon thus formed the tendons of distribution spring, four in number, one to the hallux and others to each of the three anteriorly directed toes (fig. 4, p. 342), that to the former being generally separated off before any of the others.

Among Homalognatous birds the only group in which I have observed this condition is that of the Cathartidæ—both *Cathartes atratus* and *Sarcorhamphus gryphus* possessing it, and so differing entirely from their supposed allies the diurnal Accipitres. Among Anomalognatous birds the arrangement is very commonly found; I have seen it in

<i>Coracias garrula,</i>	<i>Podargus cuvieri,</i>
<i>Buceros rhinoceros,</i>	<i>Caprimulgus europæus,</i>
<i>Steatornis caripensis,</i>	<i>Cypselus alpinus.</i>

On looking at the plantar tendons thus arranged, without further dissection, the slip to the hallux from the conjoined deep flexor tendon seems to spring from its inner (that is, hallucial) side; whereas, from what has been said above, the long flexor of the hallux is situated external to the common flexor, at the ankle-joint.

Further, in these birds, on straining upon the distal hallux slip with one hand, at the same time that the distal slips to the remaining toes are held in the other, the two elements of the conjoined tendons tend to divide up in the direction of the ultimate fibres; and in doing so the line of rupture always develops in such a way that it leaves the thus further-separated hallux slip still on the inner side in connexion with the main *flexor perforans* tendon.

A natural condition, like this thus artificially produced one, is found in some birds closely allied to those in which the last described arrangement obtains. It is found in *Momotus lessoni*, *Dacelo gigantea*, and *Merops apiaster*. In them the tendons of the *flexor longus hallucis* and of the *flexor perforans digitorum* pass down beyond the ankle-joint in the typical manner, the former external to the latter as usual. Opposite the upper end of the tarsometatarsæ the *flexor perforans digitorum* gives off from its *inner* side the flexor slip which supplies the hallux, the majority of the tendon descending as usual towards the foot. Opposite the middle

of the tarso-metatarses it is joined by the tendon of the *flexor longus hallucis* on its outer side, whereupon the conjoined tendon splits into three divisions to supply the three anterior toes (*vide* fig. 5).

The peculiar conformation in the foot of the *Trogonidæ* is associated with an equally abnormal arrangement of the plantar tendons, which I have found in *Trogon puella* and in *Pharomacrus mocinno*. In these birds the tendon of the *flexor longus hallucis* is situated, as it

Fig. 5.

*Momotus lessoni.*

Fig. 6.

*Trogon puella.*

ought to be, external to the *flexor perforans digitorum*; it also crosses it superficially, opposite about the middle of the tarso-metatarses, sending down a slender vinculum in the normal manner. The peculiarity is in the ultimate destination of the tendons, the *flexor longus hallucis* and the *flexor perforans digitorum* each dividing into two near the metatarso-phalangeal articulation, the two portions of the former tendon running to the hallux and digit 2, the two of the latter to digits 3 and 4 (*vide* fig. 6). This arrangement is not found in any other group of birds, as far as my experience goes.

Besides the three last peculiar arrangements of the tendons, which I have not found elsewhere described, there is another still more peculiar and unexpected. I have observed it in all the Anomalo-



gonatous birds with scansorial feet which I have examined, and in them only, it being present in

*Ramphastos ariel*,  
*Megalæma asiatica*,  
*Gecinus viridis*,

*Tiga javanensis*,  
*Galbula albirostris*,  
*Urogalba paradisea*.

It is represented in fig. 8. The two tendons descend behind the ankle as usual, having their origins typical. There is nothing peculiar till they have descended two thirds down the tarso-metatarsus. About opposite the middle of that bone the *flexor longus hallucis* sends a vinculum downwards as in the Fowl, to join the tendon of the *flexor perforans digitorum*. Just above the metatarso-phalangeal articulation the tendons become arranged for distribution in a most uncommon manner. The tendon of the *flexor perforans digitorum* does not split up, but runs to one digit only, namely the third toe,

Fig. 7.

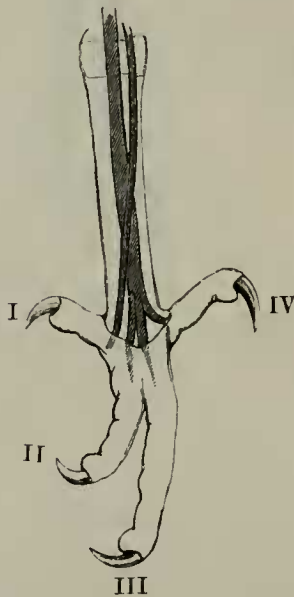
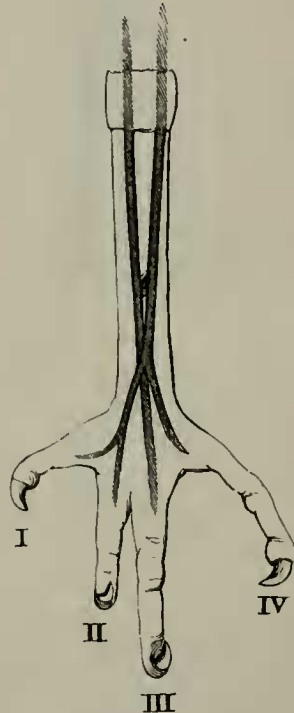
*Crotophaga sulcirostris*.

Fig. 8.

*Megalæma asiatica*.

which is the outer of the two that are directed forward. It is covered superficially by the *flexor perforans digitorum*, just as that latter muscle is splitting up to be distributed to the hallux as well as to digits 2 and 4. In these birds we have, therefore, the *flexor longus hallucis* arising from the lower surface of the femur only, running through the ankle at the outer side of the other deep tendon, and sending a vinculum downwards—all of which are